Supermicro
Microcloud SuperServer SYS-530MT-H8TNR
(X12STD-F, Intel Xeon E-2378G)

SPECrater®2017_fp_base = 53.9
SPECrater®2017_fp_peak = 58.1

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Hardware
CPU Name: Intel Xeon E-2378G
Max MHz: 5100
Nominal: 2800
Enabled: 8 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 512 KB I+D on chip per core
L3: 16 MB I+D on chip per chip
Other: None
Memory: 128 GB (4 x 32 GB 2Rx8 PC4-3200AA-E, running at 2933)
Storage: 1 x 200 GB SATA III SSD
Other: None

Software
OS: Red Hat Enterprise Linux release 8.4
Kernel 4.18.0-305.el8.x86_64
Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
Compiler Build 20201113 for Linux;
Fortran: Version 2021.1 of Intel Fortran Compiler
Classic Build 20201112 for Linux;
C/C++: Version 2021.1 of Intel C/C++ Compiler
Classic Build 20201112 for Linux
Parallel: No
Firmware: Version 1.0 released Aug-2021
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: OS set to prefer performance at the cost of additional power usage.
Supermicro

Microcloud SuperServer SYS-530MT-H8TNR
(X12STD-F , Intel Xeon E-2378G)

SPECrate®2017_fp_base = 53.9
SPECrate®2017_fp_peak = 58.1

Results Table

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SPECrate®2017_fp_base = 53.9
SPECrate®2017_fp_peak = 58.1

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset commands to bind each copy to a specific processor.
For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOCONF = "retain:true"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Red Hat Enterprise Linux 8.1
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
    sync; echo 3> /proc/sys/vm/drop_caches

(Continued on next page)
Supermicro
Microcloud SuperServer SYS-530MT-H8TNR
(X12STD-F, Intel Xeon E-2378G)

SPECrater®2017_fp_base = 53.9
SPECrater®2017_fp_peak = 58.1

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

General Notes (Continued)

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

Platform Notes

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca6c64d
running on 135-170-143.engtw Thu Nov  4 15:10:31 2021

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) E-2378G CPU @ 2.80GHz
 1 "physical id"s (chips)
 16 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
CPU family: 6
Model: 167

(Continued on next page)
Supermicro
Microcloud SuperServer SYS-530MT-H8TN
(X12STD-F, Intel Xeon E-2378G)

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

SPECrate®2017_fp_base = 53.9
SPECrate®2017_fp_peak = 58.1

Test Date: Nov-2021
Hardware Availability: Sep-2021
Software Availability: May-2021

Platform Notes (Continued)

Model name: Intel(R) Xeon(R) E-2378G CPU @ 2.80GHz
BIOS Model name: Intel(R) Xeon(R) E-2378G CPU @ 2.80GHz
Stepping: 1
CPU MHz: 1495.550
CPU max MHz: 2801.0000
CPU min MHz: 800.0000
BogoMIPS: 5616.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K
NUMA node0 CPU(s): 0-15
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
data tsc mpl sm xsavendef phys eax xpg8 8087 k8 pm xsave eax64 f16c rdrand

/proc/cpuinfo cache data
  cache size: 16384 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    node 0 size: 128815 MB
    node 0 free: 100797 MB
    node distances:
      node 0
        0: 10

From /proc/meminfo
  MemTotal: 131907500 KB
  HugePages_Total: 0
  Hugepagesize: 2048 KB

/sbin/tuned-adm active
  Current active profile: throughput-performance

(Continued on next page)
## SPEC CPU®2017 Floating Point Rate Result

**Supermicro**  
Microcloud SuperServer SYS-530MT-H8TNR  
(X12STD-F, Intel Xeon E-2378G)

### SPECrate®2017 fp_base = 53.9  
### SPECrate®2017 fp_peak = 58.1

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<td>Supermicro</td>
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**Platform Notes (Continued)**

/path/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release*/etc/*version*

```
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<th>os-release:</th>
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<tr>
<td>NAME=&quot;Red Hat Enterprise Linux&quot;</td>
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<tr>
<td>VERSION=&quot;8.4 (Ootpa)&quot;</td>
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<tr>
<td>ID=&quot;rhel&quot;</td>
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```

redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

```
uname -a:
Linux 135-170-143.engtw 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 2021
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2018-12207 (iTLB Multihit): Not affected  
- CVE-2018-3620 (L1 Terminal Fault): Not affected  
- Microarchitectural Data Sampling: Not affected  
- CVE-2017-5754 (Meltdown): Not affected  
- CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp  
- CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps barriers and __user pointer sanitization  
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling  
- CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected  
- CVE-2019-11135 (TSX Asynchronous Abort): Not affected  

run-level 3 Nov 2 16:40

SPEC is set to: /home/cpu2017

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```

From /sys/devices/virtual/dmi/id

```
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(Continued on next page)
Supermicro

Microcloud SuperServer SYS-530MT-H8TNR
(X12STD-F , Intel Xeon E-2378G)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 53.9
SPECrate®2017_fp_peak = 58.1

CPU2017 License: 001176
Test Sponsor: Supermicro
Test Date: Nov-2021
Tested by: Supermicro

Hardware Availability: Sep-2021
Software Availability: May-2021

Platform Notes (Continued)

Serial: 0123456789

Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
4x Micron Technology 18ADF4G72AZ-3G2B3 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 1.0
BIOS Date: 08/31/2021
BIOS Revision: 5.22

Compiler Version Notes

==============================================================================
| C                   | 519.blm_r(base, peak) 538.imagick_r(base, peak)                     |
|                     | 544.nab_r(base, peak)   |
==============================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
| C++                  | 508.namd_r(base, peak) 510.parest_r(base, peak)                     |
==============================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
| C++, C               | 511.povray_r(peak)      |
==============================================================================

Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

(Continued on next page)
### SPEC CPU®2017 Floating Point Rate Result

**Supermicro**

Microcloud SuperServer SYS-530MT-H8TNR  
(X12STD-F, Intel Xeon E-2378G)

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**SPECrate®2017_fp_base = 53.9**

**SPECrate®2017_fp_peak = 58.1**

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#### Compiler Version Notes (Continued)

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Compiler Version Notes (Continued)

==============================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
Fortran, C      | 521.wrf_r(peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
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Fortran, C      | 521.wrf_r(peak)
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(Continued on next page)
Supermicro
Microcloud SuperServer SYS-530MT-H8TNR
(X12STD-F , Intel Xeon E-2378G)

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 53.9
SPECrate®2017_fp_peak = 58.1

Supermicro

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2021
Hardware Availability: Sep-2021
Software Availability: May-2021

Compiler Version Notes (Continued)

Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
### Base Optimization Flags

**C benchmarks:**
- `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math`  
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  
- `-mbranches-within-32B-boundaries -ljemalloc`  
  `-L/usr/local/jemalloc64-5.0.1/lib`

**C++ benchmarks:**
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math -flto`  
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  
- `-mbranches-within-32B-boundaries -ljemalloc`  
  `-L/usr/local/jemalloc64-5.0.1/lib`

**Fortran benchmarks:**
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ipo -no-prec-div`  
- `-qopt-prefetch -ffinite-math-only`  
- `-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs -align array32byte -auto`  
- `-mbranches-within-32B-boundaries -ljemalloc`  
  `-L/usr/local/jemalloc64-5.0.1/lib`

**Benchmarks using both Fortran and C:**
- `-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math`  
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo`  
- `-no-prec-div -qopt-prefetch -ffinite-math-only`  
- `-qopt-multiple-gather-scatter-by-shuffles`  
- `-mbranches-within-32B-boundaries -nostandard-realloc-lhs`  
  `-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

**Benchmarks using both C and C++:**
- `-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math`  
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  
- `-mbranches-within-32B-boundaries -ljemalloc`  
  `-L/usr/local/jemalloc64-5.0.1/lib`

**Benchmarks using Fortran, C, and C++:**
- `-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math`  
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3`  
- `-no-prec-div -qopt-prefetch -ffinite-math-only`  
- `-qopt-multiple-gather-scatter-by-shuffles`  
- `-mbranches-within-32B-boundaries -nostandard-realloc-lhs`  
  `-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`
Supermicro
Microcloud SuperServer SYS-530MT-H8TNR (X12STD-F, Intel Xeon E-2378G)

SPECrate®2017_fp_base = 53.9
SPECrate®2017_fp_peak = 58.1

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<th>CPU2017 License: 001176</th>
<th>Test Date: Nov-2021</th>
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<td>Hardware Availability: Sep-2021</td>
</tr>
<tr>
<td>Tested by: Supermicro</td>
<td>Software Availability: May-2021</td>
</tr>
</tbody>
</table>

Peak Compiler Invocation

C benchmarks:
- icx

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

Benchmarks using both Fortran and C:
- 521.wrf_r ifort icc
- 527.cam4_r ifort icx

Benchmarks using both C and C++:
- 511.povray_r icpc icc
- 526.blender_r icpx icx

Benchmarks using Fortran, C, and C++:
- icpx icx ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
- 519.lbm_r: basepeak = yes
- 538.imagick_r: basepeak = yes
- 544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -flto
- Ofast -qopt-mem-layout-trans=4
- -fimf-accuracy-bits=14:sqrt
- -mbranches-within-32B-boundaries -ljemalloc
- -L/usr/local/jemalloc64-5.0.1/lib

(Continued on next page)
### Peak Optimization Flags (Continued)

**C++ benchmarks:**

508.namd_r: basepeak = yes

510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math
    -flto -mfpmath=sse -funroll-loops
    -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
    -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

**Fortran benchmarks:**

503.bwaves_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ipo
    -no-prec-div -qopt-prefetch -ffinite-math-only
    -qopt-multiple-gather-scatter-by-shuffles
    -qopt-mem-layout-trans=4 -nostandard-realloc-lhs
    -align array32byte -auto -mbranches-within-32B-boundaries
    -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

549.fotonik3d_r: basepeak = yes

554.roms_r: Same as 503.bwaves_r

**Benchmarks using both Fortran and C:**

521.wrf_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -O3 -ipo
    -no-prec-div -qopt-prefetch -ffinite-math-only
    -qopt-multiple-gather-scatter-by-shuffles
    -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
    -nostandard-realloc-lhs -align array32byte -auto
    -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

527.cam4_r: basepeak = yes

**Benchmarks using both C and C++:**

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -O3 -ipo
    -no-prec-div -qopt-prefetch -ffinite-math-only
    -qopt-multiple-gather-scatter-by-shuffles
    -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
    -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

526.blender_r: basepeak = yes

**Benchmarks using Fortran, C, and C++:**

(Continued on next page)
Supermicro
Microcloud SuperServer SYS-530MT-H8TNR (X12STD-F, Intel Xeon E-2378G)

SPECrate®2017_fp_base = 53.9
SPECrate®2017_fp_peak = 58.1

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2021
Hardware Availability: Sep-2021
Software Availability: May-2021

Peak Optimization Flags (Continued)

507.cactuBSSN_r: basepeak = yes

The flags files that were used to format this result can be browsed at

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-RKL-revA.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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